Low Prevalence of Hepatitis B Infections Among Residents of an Institution for the Mentally Retarded in New Mexico

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Residential institutions for the mentally retarded are considered high-risk settings for hepatitis B (HB) infection. Accordingly, HB vaccine is recommended for susceptible clients and selected staff of such facilities. However, a serologic screening program among 364 residents of Los Lunas Hospital and Training School (LLHTS) in New Mexico found only 11 residents to be anti-HBc positive (3%) and only one of these residents was also HBsAg-positive (0.3%). The unexpectedly low prevalence of HB infections at LLHTS probably reflects infrequent HB introductions into the institution. Using these serologic data, a vaccination program was instituted to prevent HB infection among LLHTS residents, thereby eliminating the need for mass screening and HB vaccination of LLHTS employees. Serologic screening among residents of other smaller institutions for the mentally retarded is recommended before design of HB prevention programs for clients and staff.

(Mann JM, Babb CJ, Hull HF, et al: Low prevalence of hepatitis B infections among residents of an institution for the mentally retarded in New Mexico. West J Med 1984 Sep; 141: 339-341)

Residential institutions for the mentally retarded have been considered a high-risk setting for hepatitis B (HB) infection.[1-7] In mid-1982, when hepatitis B vaccine became commercially available in this country, the US Public Health Service recommended that hepatitis B vaccine be administered to "susceptible clients and selected staff of institutions for the mentally retarded."[8] According to the Centers for Disease Control, residents of such institutions would be expected to have both a high prevalence of HBsAg-positivity (10% to 20%) and frequent serologic evidence of previous HB infection (35% to 80%).[8] Preliminary discussions with medical staff from Los Lunas Hospital and Training School (LLHTS), the largest state institution for the mentally retarded in New Mexico, suggested that HB infections might have been uncommon in this particular facility. Therefore, a serologic screening program was conducted to determine the prevalence of HB infection among residents and to help guide policies regarding use of HB vaccine at LLHTS.

Patients and Methods

Los Lunas Hospital and Training School

LLHTS is a state institution providing residential care for the severely and profoundly mentally retarded. The facility is located 20 miles south of Albuquerque. It opened in 1929 and resident capacity gradually increased from 76 in the late 1940s to a peak of 516 in the late 1960s. Deinstitutionalization efforts in the mid-1970s led to discharge of residents capable of living outside the institution. Consequently, current residents are severely or profoundly retarded and many are also

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Submitted, revised, March 5, 1984.

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ABBREVIATIONS USED IN TEXT

CDC=Centers for Disease Control
HB=hepatitis B
HBsAg=hepatitis B surface antigen
LLHTS=Los Lunas Hospital and Training School

multiply handicapped. Therefore, the current resident population is quite stable; from 1981 to 1983, an annual average of only 17 residents were admitted and 15 were discharged from LLHTS. At present approximately 360 residents live in 21 cottages, which range in capacity from 12 to 32 beds. Residents are grouped by level of functioning and age; some cottages are sex-segregated.

In addition to full-time residents, a respite program accepts short-term (not to exceed 60 days) institutional placement of clients normally living in the state. These temporary residents are housed with their functional and age-specific counterparts among the permanent residents. From July 1980 to June 1983 an average of 100 such short-term admissions occurred annually.

Of the 653 current LLHTS employees, 526 have direct contact with residents, as nurses, direct care staff, teachers, psychologists and other health and social service professionals. From 1981 through September 1983 annual staff turnover has averaged 30 percent. In addition to full-time staff, 80 older community residents participate in the Foster Grandparents Program and some ten part-time volunteers also work at the facility.

Serologic Screening Program

From September through November 1982 serum specimens (3 ml) were obtained from all current residents. Serum was frozen and shipped to the Scientific Laboratory Division (state laboratory) in Albuquerque. Anti-HBc testing was carried out on all specimens, using radioimmunoassay (CORAB; Abbott Laboratories, North Chicago, Illinois). Anti-HBc positive specimens were also tested for hepatitis B surface antigen (HBsAg) and anti-HBs by radioimmunoassay (AUSRIA II; AUSAB; Abbott Laboratories).

All anti-HBc-positive sera were sent to the Hepatitis and Viral Enteritis Laboratory of the Centers for Disease Control (CDC), where anti-HBc, anti-HBs and HBsAg testing was done for each specimen.

Information on each resident was abstracted from the patient's permanent record, including age, sex, ethnicity, date of admission to LLHTS, history of previous admissions to an institution, total years in institutions and major medical diagnosis.

Results

Characteristics of the Population

All current residents (364) were tested; there were 203 male and 161 female residents. Their ages ranged from 2 years to 69 years, with a median age of 25 years. Of the residents, 43% (155) were Hispanic, 41% (150) were white, non-Hispanic ("Anglo"), 13% (47) were Native American and the remaining 3% (12) were black, "mixed" or "other." (In 1980, 52.6% of New Mexico's population was Anglo, 36.3% was Hispanic, 8.1% was Native American and 2.9% was black or "other."[9]) Nearly three fourths (73%; 266) of the residents had never been admitted to another institution. Finally, the residents had been in an institution for periods ranging from one month to 48 years, with a median duration of 15 years. Only 18 residents (4.9%) had Down's syndrome.

Anti-HBc Serologic Results

Of the 364 residents 11 (3%) were anti-HBc-positive. Of these 11 there were 9 who were also anti-HBs-positive but HBsAg-negative, one who was both anti-HBs- and HBsAg-positive and one who was negative for both anti-HBs and HBsAg. Therefore, only one patient (0.3%) was HBsAg positive. Testing of HB markers at CDC agreed with Scientific Laboratory Division results in each case.

The HB-positive group included five men and six women ranging in age from 17 to 42 years, with a median age of 28.5 years. Four were Native American, four were Anglo and three were Hispanic. These patients had been in institutions from 7 to 28 years, with a median of 14.5 years; 5 of the 11 had been in institutions elsewhere before admission to LLHTS. None of the HB-marker-positive residents had Down's syndrome.

While 9% of Native American residents were anti-HBc-positive, compared with only 2% of Hispanic and 3% of Anglo residents, this difference was not significant. In addition, no significant differences between marker-positive and marker-negative residents were noted for sex, age, years in an institution, previous admission to an institution or major medical diagnosis (for example, Down's syndrome versus "other").

Discussion

The 3% anti-HBc and 0.3% HBsAg prevalence among residents of LLHTS contrasts sharply with published experience from other institutions for the mentally retarded in this country.[1-8] This difference could result from a limited ability of the serologic screening test (anti-HBc) to detect previous HB infections, since in most published studies anti-HBs plus HBsAg, rather than anti-HBc, were used as markers of past HB infection. However, anti-HBc was selected for LLHTS screening as the single serologic marker which would best identify current and recent HB infection, including chronic carriers.[8,10-12] In addition, anti-HBc appears to persist, in parallel with anti-HBs, for at least several years.[8,10-12] No single marker can provide a complete HB profile; yet while reliance on anti-HBc may underestimate the prevalence of much earlier HB infections, it nevertheless provides a reasonable index of HB activity at the LLHTS.

In other institutional studies, duration of institutional stays was most strongly and consistently associated

with increased HB marker prevalence.[3,4,6] Residents of LLHTS had been in institutions for a median of 15 years, so this factor cannot explain the low prevalence of HB infection at LLHTS.

The most plausible explanation for the low anti-HBc prevalence at LLHTS is a low rate of HB introduction into the facility. Recent data from nearly 10,000 first-time volunteer blood donors in New Mexico showed that only 0.03% were HBsAg-positive (personal communication, Toby Simon, MD, Medical Director, United Blood Services, Albuquerque, December 13, 1983), suggesting that HB infections in New Mexico may be relatively less common compared with other, particularly urban, areas of the country. The low anti-HBc prevalence at LLHTS could also be representative of smaller institutions while most published studies have involved large facilities[1-7] (approximately 800[2] to 3,600[3] residents). For example, a small (350-resident) institution in South Florida reported a 15% anti-HBc prevalence, which was recognized by the authors as unusually low for an institution for the mentally retarded.[13]

While a higher proportion of Native American residents of LLHTS were anti-HBc-positive compared with Hispanic or Anglo residents, the small numbers provide little basis for analysis. Specific data on HB among New Mexican Native Americans are not available. While a very small Arizona-based study of Navajo and Hopi found a low HB-marker prevalence,[14] systematic study would be required to elucidate HB patterns among the multiple distinct tribal groups in New Mexico.

Implications and HB Vaccination Policy at LLHTS

The LLHTS data suggest that generalizations about HB experience in residential institutions for the mentally retarded may not be applicable to all facilities. Therefore, design of an HB control program for a specific institution should be based on knowledge of the facility's particular problems and experience.

At LLHTS, the medical staff elected to administer HB vaccine to all HB-susceptible residents for several reasons. First, HB might enter the institution in the future, either from new long-term or short-term admissions from the community or from out-of-state institutional transfers. Entry of an HBsAg-positive client into a highly susceptible resident population would create substantial logistic problems, including the need for previous HB vaccination of the entrant's susceptible cottagemates and assurance that exposures of other residents to the potentially infectious new resident would be minimized. Second, prevention of HB among residents would reduce or eliminate the rationale for HB susceptibility testing and vaccination of more than 500 employees having direct contact with residents, along with nearly 100 foster grandparents and volunteers.[5,8,9] In addition to the cost of vaccinating current staff, the institution's high employee turnover rate would ensure a considerable expense if ongoing testing and vaccination programs were required.

At LLHTS, once vaccination of the stable resident population is completed, serologic screening of new admissions will identify susceptible persons for vaccination and HBsAg-positive entrants for special management. Staff likely to have regular contact with an HBsAg-positive person newly admitted will be educated regarding HB transmission and its prevention. Depending upon an individual assessment of the HBsAg-positive new resident (including HBeAg and anti-HBe testing and consideration of behavioral and medical characteristics) a limited program of serologic screening or HB vaccination of staff could be implemented, if required. (This approach has already been applied to the single HBsAg-positive resident identified in the screening program. Since the resident was not aggressive, anti-HBe-positive and HBeAg-negative, he was considered unlikely to transmit HB and only educational precautions for certain staff were judged necessary.) Finally, if a substantial number of HBsAg-positive persons were to be newly admitted to LLHTS in the future, this individually tailored and limited approach to HB risk management for staff would be reconsidered.

In summary, serologic screening for HB among residents of smaller institutions for the mentally retarded is recommended since it may provide useful information for design of a rational HB prevention program for clients and staff.

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